

## DEPARTMENT OF GRAPHIC ARTS TECHNOLOGY AND APPLIED PHOTOCHEMISTRY

**Head of Department:**  
Assoc. Prof. Michal Čeppan, PhD

Telephone: ++421252495276  
Fax: ++421252493198  
E-mail: michal.ceppan@stuba.sk

### I. STAFF

**Associate Professors:**

Michal Čeppan, PhD; Milan Mikula, PhD; Ján Panák, PhD;

**Assistant Professors :**

Vladimír Dvonka; Bohuslava Havlínová, PhD; Viera Jančovičová, PhD;

**Research Fellows:**

Zuzana Jakubíková; Juraj Kindermay, PhD; Milena Reháková, PhD;

**PhD Students:**

František Belányi (till 30. 11. 2003); Erika Hrehorová; Ivana Lörinczová; Branislav Prosnan (since 1. 10. 2003);

**Technical staff:**

Mária Bardúnová; Martin Kovalčík (till 11. 11. 2003);

### II. TEACHING AND RESEARCH LABORATORIES

**A. Teaching laboratories:**

Laboratory of Printing Technology  
Laboratory of Photochemistry and Photography  
Laboratory of Optical Spectroscopy and Photometry  
Laboratory of Thin Films and Plasma Technology  
Laboratory of Rheology

**B. Research laboratories:**

Laboratory of Absorption Spectroscopy and Colorimetry

### III. TEACHING

**A. Undergraduate Study:**

<b>6. semester (Bc)</b>	Paper and Print, Graphic Arts	2/2	Krkoška, Panák
	Term Project	0/4	Mikula and other members of academic staff
<b>1. semester (MSc)</b>	Colloids Systems and Interfaces	2/1/0	Bakoš, Mikula, Reháková
	Polymer and Paper Physics	0/2/0	Jančovičová
	Photochemistry and Photography I.	2/1/0	Čeppan, Reháková
	Surface and Thin Film Technology	2/0/0	Mikula
<b>1. semester (MSc)</b>	Advanced Laboratory Course I.	0/0/9	Havlínová, Jančovičová, Mikula, Reháková
	Typography and Text Processing	0/2/0	Dvonka
<b>2. semester (MSc)</b>	Photochemistry and photography II.	2/0/0	Čeppan
	Printing Technology I.	2/0/0	Panák
	Advanced laboratory Course II.	0/0/7	Čeppan, Dvonka, Havlínová, Jančovičová
	Planning for Printing Production	0/2/0	Panák, Dvonka
<b>2. semester (MSc)</b>	Text and Image Processing	1/1/0	Čeppan, Dvonka
<b>3. semester (MSc)</b>	Printing Technology II.	2/0/0	Panák
	Repronics	1/3/0	Mikula, Dvonka
	Advanced Laboratory Course III:	0/0/10	Panák, Dvonka
<b>4. semester (MSc)</b>	Diploma Thesis	0/0/27	members of the academic staff

## IV. CURRENT RESEARCH PROJECTS

### A. 5th Framework Program of European Commission: High Productivity and Low Cost for the Encapsulation of Thin Film Solar Cells (NAS-HIPROLOCO) (M. Mikula).

Development of new, material saving, energy saving, automated and cost effective encapsulation systems and processes for thin film solar cells.

Structural analysis of multilayer system based on polymer foil substrate and inorganic and polymeric layers. The quality of interfaces and their role in adhesion and long term stability of the system.

The study of the barrier properties against the permeation of oxygen and water vapour, the permeation mechanism water through inorganic and organic barrier layers. Aging of the barrier properties. Detailed physical and chemical analysis of the high barrier layer system.

**Project duration:** from 01. 09. 2002 to 31. 08. 2004

### B. VEGA Project No 1/9146/02 Preparation and modification of thin surface layer properties of image-generating structures and their substrates (Milan Mikula).

New type of atmospheric surface discharge treatment of polymer foil substrates considering printability, metalization, lamination, adhesion, mechanical and optical properties of this system in comparison with still-in-use barrier discharge ("corona").

New polymers and copolymers preparation by means of photoinitiated polymerization in thin layers with wanted physical and chemical properties. New information about photochemical reactions of selected photopolymer systems. Photochemical modification of water-soluble based polymers layers, changing their hydrophilic, optical and permeation properties with reference to the imaging technology.

**Project duration:** from 01. 01. 2002 to 31. 12. 2004

### C. VEGA Project No 2/1119/21 (SAV) Study of optical, structural and electric properties of amorphous (a-Si:H, a-SiGe:H) semiconductors after their interactions with plasma particles and/or ion beams (Ě. Pinčík, SAV, Milan Mikula, STU).

Experimental and theoretical study. Optical absorption properties of semiconductor layers with different defects in bandgap. Thin dielectric blocking layers of SiO<sub>2</sub>, Si<sub>3</sub>N<sub>4</sub> and interfaces, their properties towards the effective solar cell production on the base of amorphous silicon

**Project duration:** from 01. 01. 2001 to 31. 12. 2003

### D. 5<sup>th</sup> Framework Programme of EU: Thematic Network /EVK4-CT-2002-20010 Transitional Metals in Paper (MIP), (Michal Čeppan).

Transitional metals may cause an accelerated ageing of historic paper documents, drawings and other cellulose containing objects. The aim of the network MIP is to exchange present knowledge related to the effects and on how to reduce the effects of transitional metals in paper and how to fit in these results to innovative conservation strategies consisting of assessments methods and treatment technologies.

**Project duration:** from 01. 03. 2003 to 01. 03. 2006

### E. Vega Project No 1/9145/02 Properties of Materials, Constituents and Structures of Printed Images on Polymeric Substrates (Michal Čeppan).

Development and implementation of the methods of imaging photometry and image analysis of printed images structures on polymeric. Development of method for accelerated light ageing of paper, printing inks, and prints using metal-halogen and fluorescent lamps. Construction of laboratory system for accelerated light ageing using metal-halogen and fluorescent lamps, its basic characterization and calibration. Evaluation of methods and mechanism of printing inks conservation against ageing and attaining new knowledge about relation between various types of paper and inks during ageing of graphic structures on polymeric substrates. Study of influence of fountain solution composition and amount of emulsified fountain solution on rheological properties of offset printing inks. Explaining the influence of printing inks on the emulsions printing ink – fountain solution

**Project duration:** from 01. 01. 2002 to 31. 12. 2004

**V. CURRENT EDUCATION PROJECTS****VI. COOPERATION****A. Cooperation in Slovakia**

Institution	Type of cooperation	Responsible person	Duration
Purgina	Investigation and evaluation of printing colouring for different printing technologies	Krchňavý Rastislav, technologist, Pri Šajbách 1, 831 06 Bratislava	01. 10. 2003 -
Slovak National Archives	Study of ageing of printed documents	Hanus Jozef, head of the Department of archival preservation, Drotárska cesta 42, 817 01 Bratislava	01. 01. 2000 -
Institute of Physics SAS	Amorphous a-Si:H structures for solar cells (VEGA project) Study of barrier layers (EC project)	Pinčík Emil, Dúbravska cesta 9, 845 11 Bratislava	01. 01. 2001 -
Faculty of Mathematics, Physics Informatics, and CU, Bratislava	Polymer surface treatment by atmospheric discharges	Černák Miroslav, Mlynská dolina, 842 48 Bratislava	01. 09. 2000 -

**B. International Cooperation**

Institution	Type of cooperation	Responsible person	Duration
Departement de Photochimie Generale, Université de Haute Alsace, Mulhouse, France	UV curing reaction of waterbased clearcoats	Decker Christian, professor, 3 rue Alfred Werner, Mulhouse Cedex, France	01. 09. 2002 -
Fraunhofer Institute process Engineering and Packaging (IVV), Freising, Germany	Research of barrier layers on flexible foils (EC project)	Noller Klaus, dr., Fraunhofer Inst. IVV, 853 54 Freising	01. 09. 2002 -
Fraunhofer Institute for Silicate Research, Wurzburg, Germany	Properties of Ormocer lacquer layers (EC project)	Amberg-Schwab Sabine, dr., Fraunhofer Inst. ISC, 970 82 Wurzburg	01. 09. 2002
Faculty of Chemistry, Technical University Brno, Czech Republic	Photochemical properties of light sensitive layers	Michal Veselý, vice-dean, Purkyňova 118, 612 00 Brno	01. 09. 2001 -
Printing House Model Opava, Opava, Czech Republic	Investigation and quality evaluation of offset printing	Matýsek Jiří, Těšínska 101, 74601 Opava, Czech Republic	01. 04. 2002 - 31. 01. 2003
State Central Archives in Prague, Czech Republic	Longlasting measurements of nonaged and aged papers	Đurovič Michal, head of department, Archivní 4, 149 01 Praha 4 - Chodovec	01. 01. 2001 -
X-Rite Pardubice, Czech Republic	Hue colour ink computer formulation	Černý Jan, S. K. Neumanna 1316, 53207 Pardubice	01. 09. 2002 - 30. 06. 2003

**C. Membership in Domestic Organizations and Societies**

Name	Organisation or Society	Position	Valid date
Čeppan Michal	Slovak Union for Industrial Chemistry	member	1980 -
Dvonka Vladimír	Slovak Union for Industrial Chemistry	member	1996 -
Havlíková Bohuslava	Slovak Union for Industrial Chemistry	member	1980 -
Jančovičová Viera	Slovak Union for Industrial Chemistry	member	1999 -

<b>Kindernay Juraj</b>	Slovak Union for Industrial Chemistry	member	1999 -
<b>Mikula Milan</b>	Slovak Union for Industrial Chemistry	member	1980 -
<b>Panák Ján</b>	Slovak Union for Industrial Chemistry	member	1978 -
<b>Reháková Milena</b>	Slovak Union for Industrial Chemistry	member	2001 -

**D. Membership in International Organisations and Societies**

Name	Organisation or Society	Position	Valid date
<b>Čeppan Michal</b>	European Photochemistry Association	member	1990 -
<b>Čeppan Michal</b>	International Society of Imaging Science and Technology, Springfield, USA	member	1985 -
<b>Michal Čeppan</b>	Graphic Arts Technical Foundation, Sewickley, USA	member	1988 -

**E. Visitors from Abroad**

Name	Organisation or Institution	State	Date / Duration
<b>Kaplanová, M.</b>	University of Pardubice, Pardubice	Czech Republic	January 2003 (1 day)
<b>Pekař, M.</b>	Brno University of Technology, Brno	Czech republic	January 2003 (1 day)
<b>Lapčík, L.</b>	Tomas Bata University, Zlín	Czech Republic	January 2003 (1 day)
<b>Lapčík, L.</b>	Tomas Bata University, Zlín	Czech Republic	June 2003 (2 days)
<b>Veselý, M.</b>	Brno University of Technology, Brno	Czech Republic	June 2003 (2 days)
<b>Holická, H.</b>	University of Pardubice, Pardubice	Czech Republic	September 2003 (4 days)

**F. Visits of Staff Members and Postgraduate Students in Foreign Institutions**

Name	Organisation / Institution / Conference	State	Date / Duration
<b>Jakubíková, Z.</b>	Brno University of Technology, Brno	Czech Republic	February 2003 (3 days)
<b>Čeppan, M., Reháková, M.</b>	Model Obaly, a.s. Opava,	Czech Republic	February (1 day)
<b>Mikula, M.</b>	Fraunhofer Institute Process Engineering and Packaging, Freising	Germany	February (2 days)
<b>Čeppan, M., Belányi, F., Dvonka, V., Havlínová, B., Hrehorová, E., Jakubíková, Z., Jančovičová, V.</b>	Seminar Print Media, Heidelberg	Germany	March (5 days)
<b>Kindernay, J., kovačik, M., Lörinczová, I., Reháková, M.</b>	Seminar Print Media, Heidelberg	Germany	March (5 days)
<b>Havlínová, B.</b>	State Central Archives, Prague	Czech Republic	March (4 days)
<b>Jančovičová, V.</b>	Brno University of Technology	Czech Republic	April (3 days)
<b>Čeppan, M., Mikula, M.</b>	Isovolta AG, Werndorf	Austria	April (2 days)
<b>Jančovičová, V.</b>	X-Rite, Pardubice	Czech Republic	May (1 day)

Čeppan, M., Belányi, F., Dvonka, V., Jakubíková, Z., Jančovičová, V., kindernay, J., Mikula, M.,	22th International fair EMBAX	Czech Republic	May (1 day)
Panák, J., Reháková, M.	22th International fair EMBAX	Czech Republic	May (1 day)
Hrehorová, E.	22th International fair EMBAX	Czech Republic	May (2 days)
Čeppan, M.	TNO Industrial Technology and the University of Northumbria, Amsterdam, New Castke	Holland, UK	May (3 days)
Čeppan, M.	University of Pardubice, Pardubice	Czech Republic	Jun (3 days)
Čeppan, M.	Brno University of Technology	Czech republic	June (3 days)
Čeppan, M., Belányi, F., Dvonka, V., Havlíňová, B., Jakubíková, Z., Jančovičová, V., Mikula M.,	6 <sup>th</sup> Seminar of Graphic Arts, Pardubice	Czech republic	September (3 days)
Panák, J.	6th Seminar of Graphic Arts, Pardubice	Czech republic	September (3 days)
Čeppan, M.	12 <sup>th</sup> Seminar of Restorers and Historians, Prague	Czech republic	October (2 days)
Reháková, M.	12th Seminar of Restorers and Historians, Prague	Czech republic	October (4 days)
Čeppan, M., Mikula, M.	Centre for solar energy and hydrogen resear Baden Wuttenberg, Stuttgart	Germany	October (3 days)

## VII. THESES AND DISSERTATIONS

### A. Graduate Theses (Bc Degree) for state examinations after three years of study

Name	Title of Thesis	Supervisor
Čeppcová, K.	Modulation transfer function measurement of printed flexible foils	Dvonka, V.
Grachová, L.	Study of thin polymer film properties on paper substrate	Reháková, M.
Hodál, M.	Influence of radiation intensity and layer thickness on UV varnish curing	Jančovičová, V.
Hoferíková, A.	Study of light stability of aryl-methane dyes in solution	Jančovičová, V.
Iždinská, Z.	Characterization of modern writing tools using UV VIS spectroscopy	Jančovičová, V.
Košová, J.	Influence of external factors on stability of digital printing	Reháková, M.
Můková, J.	Study of accelerated light ageing of flexographic inks on board LENETA	Havlíňová, B.
Perašínová, L.	Monitoring of water, pastel and oil colours stability influenced by germicide	Havlíňová, B.
Polončanová, P.	Study of printing quality according to evaluated parameters	Dvonka, V.
Popovičová, H.	Study of acrylate UV varnish polymerization	Jančovičová, V.
Rehák, P.	Study of photoinitiated polymerization of acrylates	Blažková, A.
Šubrťová, M.	Study of paper gloss angle dependance according to its smoothness	Mikula, M.
Trnovec, B.	Study of relation of gloss angle dependence on paper surface	Mikula, M.
Uherová, A.	Study of ink-jet and laser prints stability effected by accelerated wet aging	Havlíňová, B.
Voltemarová, V.	Experimental evaluation of colour management system	Čeppan, M.

### B. Graduate Theses (MS Degree) for state examinations after five years of study

Name	Title of Thesis	Supervisor
Černáková, H.	Study of accelerated ageing of prints	Reháková, M.
Debnárová, Z.	Damping and quality of offset printing	Panák, J.
Fialkovič, J.	Study of historical documents ageing processes - corrosion of iron-gall inks	Čeppan, M.
Horáčiková, K.	Study of surface and adhesion properties of PP foils treated by barrier discharge	Mikula, M.
Hricková, J.	Reoviscosimetry of offset printing inks	Panák, J.
Janatová, Z.	Study of ink-jet and laser colour prints stability	Havlíňová, B.
Moricová, P.	Photochemically initiated polymerization of urethane-acrylates	Jančovičová, V.
Mrláková, I.	Preparation and photochemical modification of polymeric layers based on water-soluble polymer derivates	Jančovičová, V.

<b>Paulínyová, Z.</b>	Options of hue colour ink computer formulation with respect to printed substrate variability	Jančovičová, V.
<b>Prosnan, B.</b>	Study of SiO <sub>x</sub> layer properties on polymeric substrate	Mikula, M.
<b>Studnička, M.</b>	Study of printing stability of packages	Čeppan, M.
<b>Ščambová, I.</b>	Image quality in ink-jet printing	Čeppan, M.
<b>Švorcová, L.</b>	Investigation of modification of modern printing matters after ageing	Havlíňová, B.
<b>Tomášová, D.</b>	Factors of printed flexible foils colour stability	Mikula, M.
<b>Vyšná, M.</b>	Influence of variable parameters on offset printing stability	Reháková, M.

**C. Dissertations (PhD)**

Name	Title of Thesis	Supervisor
<b>Kindernay, J.</b>	Studing and controlling methods of UV photopolymeric composition curing	Mikula, M.

**E. Habilitation Theses**

Name	Title of Thesis	Head of board
<b>Panák, J.</b>	Rheology study of offset inks and damping in offset printing	Marcinčin, A.

**VIII. PUBLICATIONS****A. Journals**

- [1] Čeppan, M., Fedák, J., Dvonka, V., Veselý, M., Zmeškal, O.: Fractal Spaces of Spectra Sets of Color Prints. *J. Imag. Sci. Technol.* 47(2), 171-184 (2003).
- [2] Lörinczová, I., Jančovičová, V., Čeppan, M.: Hydrofobizácia povrchových polymérnych vrstiev UV žiarením. Hydrophobization of surface polymer layers using UV light. *Chem. Listy* 97 (5), 265–268 (2003).
- [3] Mikula, M., Čeppan, M., Vaško, K.: Gloss and goniochromimetry of printed materials. *Color Research and Application* 28 (5), 335-342 (2003).
- [4] Mikula, M., Jakubíková, Z., Zahoranová, A.: Surface and adhesion changes of atmospheric barrier discharge treated polypropylene in air and nitrogen. *J. Adhesion Sci. Technol.* 17 (15), 2097-2110 (2003).
- [5] Reháková, M., Mikula, M., Čeppan, M., Malec, B.: Proces starnutia a hodnotenia stability grafických zobrazení. Aging process and stability evaluation of graphic images. *Chem. Listy* 97, 140-145 (2003).
- [6] Lörinczová, I., Jančovičová, V., Čeppan, M.: Prijímacie vrstvy ink-jetových médií. Receiving polymerlayers of ink-jet media. *Papír a celulóza* 58 (1), 22–24, (2003).
- [7] Vizárová K., Cedzová M., Reháková M., Šutý Š.: Vplyv svetelnej expozície na zmeny vlastností súčasných papierov v priebehu urýchleného starnutia. The influence of light exposition on changes of contemporary papers properties in accelerated ageing. *Papír a celulóza* 58 (9), 264-267 (2003).

**B. Conferences**

- [1] Lörinczová, I.\*, Decker, C.: Waterbased UV-curable urethane-acrylate clearcoats for offset prints. In: Proc. Int. Conference on Chemical Technology of Wood, Pulp and Paper, WPP2003. Bratislava (Slovak Republic), Sept. 17-19, 2003. Ed. by Baudin G., Fellegi J., Gellerstedt G., Katuscak S., Pikulik J., Paris J., pp. 487–490 (2003). ISBN 80-227-1942-0. (Po)
- [2] Reháková, M.\*, Čeppan, M., Černáková, H., Dvonka, V., Hrehorová, E., Kindernay, J.: Light stability of ink-jet prints. In: Proc. Int. Conference on Chemical Technology of Wood, Pulp and Paper, WPP2003. Bratislava (Slovak Republic), Sept. 17-19, 2003. Ed. by Baudin G., Fellegi J., Gellerstedt G., Katuscak S., Pikulik J., Paris J., pp. 440–443 (2003). ISBN 80-227-1942-0. (Po)
- [3] Reháková, M.\*, Vizárová, K., Hrehorová, E., Račková, K.: The influence of internal and external factors on the ink-jet print quality in the ageing process. In: Proc. Int. Conference on Chemical Technology of Wood, Pulp and Paper, WPP2003. Bratislava (Slovak Republic), Sept. 17-19, 2003. Ed. by Baudin G., Fellegi J., Gellerstedt G., Katuscak S., Pikulik J., Paris J., pp. 417–421 (2003). ISBN 80-227-1942-0. (Po)
- [4] Vizárová, K.\*, Reháková, M., Hrehorová, E., Jančovičová, V., Jakubíková, Z.: Preparing and properties of polymer protective films on the paper substrate. Preparing and properties of polymer protective films on the paper substrate. In: Proc. Int. Conference on Chemical Technology of Wood, Pulp and Paper, WPP2003. Bratislava (Slovak Republic), Sept. 17-19, 2003. Ed. by Baudin G., Fellegi J., Gellerstedt G., Katuscak S., Pikulik J., Paris J., pp. 412–416 (2003). ISBN 80-227-1942-0. (Po)
- [5] Belányi, F.\*, Havlíňová, B., Brezová, V., Čeppan, M., Novotná, M., Jakubíková, Z.: The stability of offset inks on paper upon ageing. The stability of offset inks on paper upon ageing. In: Proc. Int. Conference on Chemical Technology of Wood, Pulp and Paper, WPP2003. Bratislava (Slovak Republic), Sept. 17-19, 2003. Ed. by Baudin G., Fellegi J., Gellerstedt G., Katuscak S., Pikulik J., Paris J., pp. 462–467 (2003). ISBN 80-227-1942-0. (Pr)
- [6] Brezová, V.\*, Pigošová, J., Havlíňová, B., Dvoranová, D., Ďurovič, M.: The photodegradation of dyes studied by EPR spectroscopy. In: Proc. Int. Conference on Chemical Technology of Wood, Pulp and Paper, WPP2003. Bratislava (Slovak Republic), Sept. 17-19, 2003. Ed. by Baudin G., Fellegi J., Gellerstedt G., Katuscak S., Pikulik J., Paris J., pp. 348-353 (2003). ISBN 80-227-1942-0. (Pr)
- [7] Csomorová, M.\*, Havlíňová, B., Brezová, V., Ďurovič, M., Mináriková, J.: Degradation resistance of three-layer corrugated board printed by flexographic inks. In: Proc. Int. Conference on Chemical Technology of Wood, Pulp and Paper, WPP2003. Bratislava (Slovak Republic), Sept. 17-19, 2003. Ed. by Baudin G., Fellegi J., Gellerstedt G., Katuscak S., Pikulik J., Paris J., pp. 482–486 (2003). ISBN 80-227-1942-0. (Pr)
- [8] Decker, C.\*, Lörinczová, I.: UV- radiation curing of waterbased acrylate coatings. In: Proc. RadTech Europe Conf, Berlin (Germany), November 3-5, 2003. Ed. by Vincentz, Hannover (Germany), Vol. 2, pp. 669-678 (2003). (Pr)

- [9] Hanus, J.\*; Havlínová, B., Janatová, Z., Mináriková, J., Hanusová, E., Ďurovič, M.: Permanence evaluation of colour records made by ink-jet and laser printers. In: Proc. Int. Conference on Chemical Technology of Wood, Pulp and Paper, WPP2003. Bratislava (Slovak Republic), Sept. 17-19, 2003. Ed. by Baudin G., Fellegi J., Gellerstedt G., Katuscak S., Pikulik J., Paris J., pp. 366-373 (2003). ISBN 80-227-1942-0. (Pr)
- [10] Mikula, M.\*, Čeppan, M., Vaško, K., Jakubíková, Z.: Gloss and multiangle colorimetry of printed materials. In: Proc. Int. Conference on Chemical Technology of Wood, Pulp and Paper, WPP2003. Bratislava (Slovak Republic), Sept. 17-19, 2003. Ed. by Baudin G., Fellegi J., Gellerstedt G., Katuscak S., Pikulik J., Paris J., pp. 468-472 (2003). ISBN 80-227-1942-0. (Pr)
- [11] Belányi, F.\*, Janatová, Z., Havlínová, B., Hanus, J., Lörinzová, I.: Vyhodnotenie stálosti farebných záznamov ink-jetových a laserových tlačiarní. Stability evaluation of colour image of ink-jet and laser printers. In: Sborník přednášek VI. polygrafický seminář. Pardubice (Czech Republic), Sept 23.-24., 2003, pp. 51-57 (2003). ISBN 80-7194-561-7. (Pr)
- [12] Csomorová, M.\*, Havlínová, B., Brezová, V., Belányi, F.: Vlnitá lepenka potlačená flexotlačovými farbami a zmeny jej správania sa počas urýchleného starnutia. Paper boards printed with flexographic inks and changes during accelerated ageing. In: Sborník přednášek VI. polygrafický seminář. Pardubice (Czech Republic), Sept 23.-24., 2003, pp. 58-62 (2003). ISBN 80-7194-561-7. (Pr)
- [13] Dvonka, V.\*, Ščambová, I., Čeppan, M.: Hodnotenie kvality zobrazenia inkjetovej tlače. Quality image evaluation of ink-jet printing. In: Sborník přednášek VI. polygrafický seminář. Pardubice (Czech Republic), Sept 23.-24., 2003, pp. 117-123 (2003). ISBN 80-7194-561-7. (Pr)
- [15] Jakubíková, Z.\*, Mikula, M., Šutý, Š., Tmovec, B.: Uhlová závislosť lesku vo vzťahu k hladkosti papiera. Angular dependence of gloss related to the paper smoothness. In: Sborník přednášek VI. polygrafický seminář. Pardubice (Czech Republic), Sept 23.-24., 2003, pp. 9-14 (2003). ISBN 80-7194-561-7. (Pr)
- [16] Jakucewicz, S.\*, Panák, J.: Štúdium kvality tlače plnofarebných výtlačkov z hárkového ofsetového stroja na nenatieraných papieroch. Study of printing quality of full-colour prints of sheet-fed press on uncoated papers. In: Sborník přednášek VI. polygrafický seminář. Pardubice (Czech Republic), Sept 23.-24., 2003, pp. 15-24 (2003). ISBN 80-7194-561-7. (Pr)
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